

ABSTRACT

Enabling a relatively fast look up for a rule associated with an arbitrarily selectable IP address. In one embodiment, RSBound objects are sorted into an array where each RSBound object is composed of a bound IP address (BIP), sister BIP, type, index, sister index, and a configured rule. The BIPs are derived from arbitrary user-specified IP addresses or IP address ranges. Each single IP address configuration derives one RSBound entry, where the BIP is the given IP address itself; and each IP range configuration derives two RSBound entries, and the range's lower bound and upper bound are their respective BIPs. The array is sorted primarily based on the RSBound's BIP value, and their type and pair information are the tiebreakers. If a configured rule needs to be searched for a given IP address, a binary search is performed first to find a starting entry, from where a jump-skip search is performed to find the best matching rule for the given IP address. Additionally, although this invention is well suited for IP range matching, it can also be used to match keys with arbitrary ranges of other non-IP address types, e.g., mobile telephone numbers.